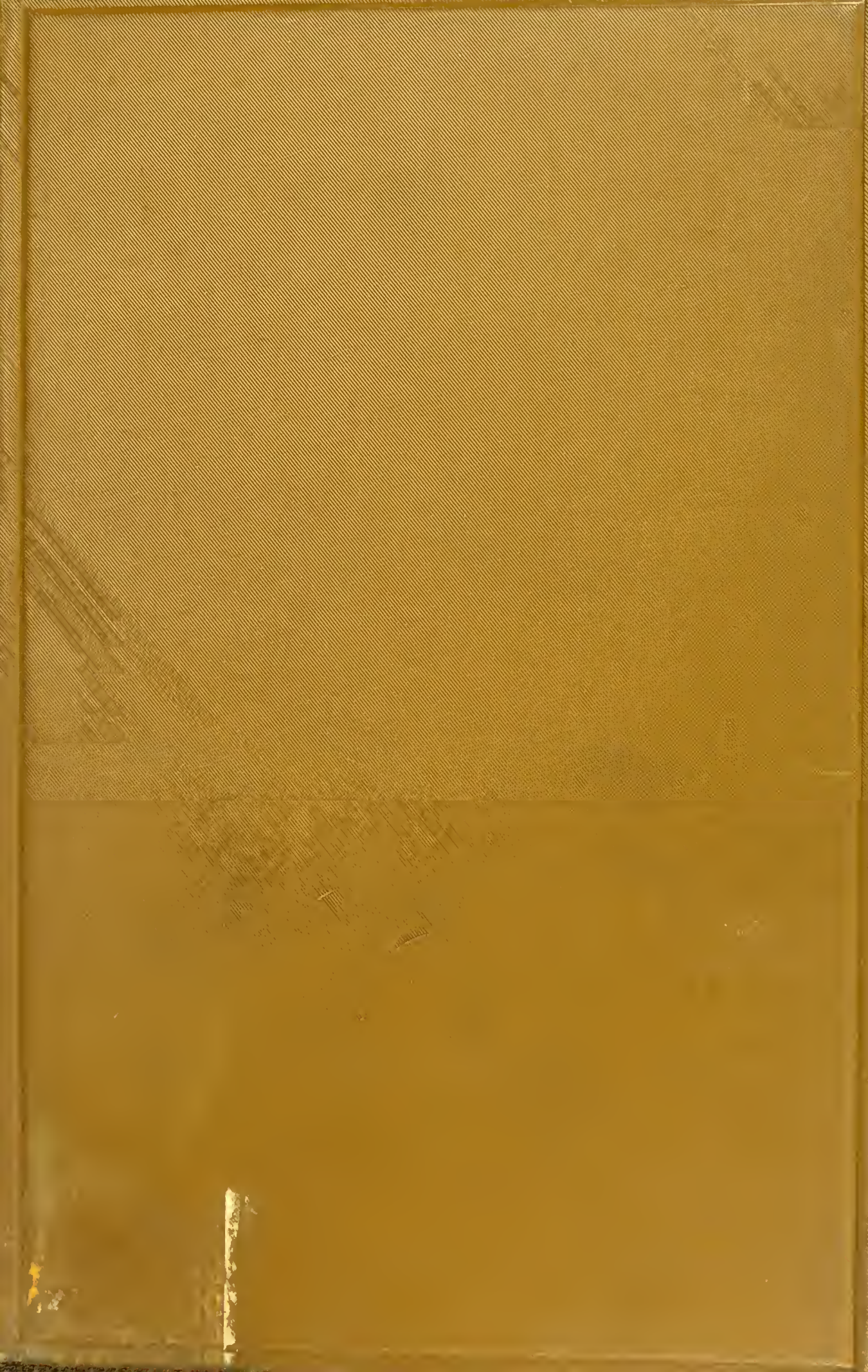






POST-NASAL GROWTHS

POST-NASAL GROWTHS

BY

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PREFACE.

THE second chapter of this little book is a reprint of a paper published in the current number of the St. Bartholomew's Hospital Reports, and endeavours to show that in cases of nasal obstruction, especially when caused by post-nasal growths, respiration is nasal and not buccal during sleep. It is published in this form in the hope of bringing forward a few new points with respect to post-nasal growths, and of once more laying stress upon their importance as factors in the production of morbid conditions and actual disease.

In order to make it of greater service to general practitioners and students I have included an account of the ætiology, symptomatology and pathology of the trouble, and have also discussed other complications not directly due to persistence in nasal respiration, and I

have tried to review in a fair light the indications for operation.

This sketch, which is in no way meant to be an exhaustive treatise on the subject, will, I trust, be useful, and help to prove that there is more than sufficient excuse for specialists who so frequently urge the removal of these offending bodies.

The term post-nasal growths is used throughout in its restricted sense, and applies only to adenoid vegetations or hypertrophic enlargement of the lymphoid tissue in the naso-pharynx.

At a discussion of the Laryngological Society of London, held on April 11th, 1894—after these pages had been sent to press—I was glad to find that the views I had already put forward concerning the necessity for a thorough removal and consequently for a more prolonged anæsthesia than can be procured by the administration of gas, were in accordance with the majority of opinions there expressed.

C. A. P.

41 Queen Anne Street, W.

April, 1894.

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ERRATA.

Page 7, last line, *for* " V-shaded " *read* " V-shaped."

Page 85, lines 6 and 7 from top, *for* "to abolish all reflexes. As it is most important *read* "to abolish all reflexes, as it is most important

POST-NASAL GROWTHS.

CHAPTER I.

GENERAL SKETCH OF POST-NASAL GROWTHS.

Historical and Introductory.—It is now thirty-four years since Czermak first recognised the existence of adenoid vegetations in the post-nasal space, twenty-six since Meyer first brought their existence prominently before the profession, and thirteen years since the subject was given far greater publicity by being fully discussed at the International Medical Congress (1881), yet even now there is great diversity of opinion as to their importance. Some practitioners do not recognise them at all, others recognising their existence apparently fail to see in them a source of disease and unhealthiness sufficient to justify operative measures; whilst others again look upon them as the *fons et origo* of all the ailments of childhood. The statement

that some do not recognise them at all is based upon the fact that one so often sees cases of chronic middle ear catarrh which drift of their own accord to the specialist or to hospitals, having previously been treated by duly qualified medical men perhaps for months unsuccessfully. It has never been even suggested to them that there might be a growth at the back of the nose which required removing, but on the contrary the patients themselves, or their parents, have been assured that they will grow out of it. That other practitioners do not see in them an evil sufficiently great to advise removal by operation is shown by the fact that parents are often told that a change of air to the sea-side and "time" will do all that is requisite in putting their children to rights. Undoubted improvement certainly takes place by residence at the sea-side for a couple of months or so, and in a few instances this and tonics, combined with local applications, may be sufficient, which indeed adds encouragement to those who hold these views. Unfortunately, however, this alleviation is, as a rule, only temporary; the very first cold the child

contracts after his return the symptoms and mischief reappear, and his condition is nearly as bad as ever again. Much time, expense, and trouble would have been saved by a simple operation in the first instance. Again, there are certainly some few who attach to these growths an abnormal importance, and who see in them a cause for remote troubles which cannot be traced to them with ease or certainty, and have consequently perhaps been too ready to interfere unnecessarily, thus laying themselves open to a serious charge, which one not unfrequently hears raised against specialists. Yet my own experience leads me to think that so very many grave troubles can truly be traced directly or indirectly to the presence of growths in this particular situation that one hopes the charge is as a rule unfounded. I do not think that general practitioners or consultants are even now ready enough to realize their importance, and to recommend their removal, and my excuse for once more bringing before the profession a subject on which so much has been said and written, is my strong conviction that they do lead to most far

reaching consequences, and that a child's general welfare is harmfully influenced by their continued existence. It is true that adenoid vegetations will as a rule almost entirely disappear as the patient reaches adolescence, but the ills which they have produced in the meanwhile may be life-lasting; and moreover, one must bear in mind that the longer the growths are allowed to remain the more difficult it is to rectify the evils which they have caused.

Influence of sex and age on occurrence.—Adenoid vegetations occur both in males and females, but according to statistics more frequently in the former. They are seen chiefly in children up to the age of sixteen, though they are by no means uncommon between sixteen and twenty, and are met with between twenty and thirty, and even older. Of my own cases I have kept notes of fifty, some details of which will be found on pages 31 and 32. Of these twenty-six were males and twenty-four females. Twenty-nine occurred in children under ten years, fourteen from ten to sixteen years of age, five between sixteen and twenty, and only two over twenty. Moreover, I

find that during the last ten years 1281 cases have been admitted for removal of post-nasal growths at the Throat Hospital, and that of these 631 were males and 650 females. So from these figures it would appear that the trouble is almost equally common in both sexes, and that medical advice at any rate is very much more often sought before the age of ten than afterwards. They commence in some instances at a very early age, and Bosworth states, that probably they are not infrequently congenital. I have felt sure of their existence at six months, and have found them by digital examination at nine months, and I have removed them at eighteen months. In older people who have had post-nasal growths when young, traces of them may generally be found in the shape of a firm pad of thickening in the pharyngeal vault, which can readily be seen by posterior rhinoscopy obliterating the view of the upper part of the posterior end of the nasal septum. It is generally in the middle line, though it may be slightly to the right or left. In passing it may be noted that this thickening may cause, or keep up, symptoms

of chronic catarrh and deafness, and that great good may be done by its removal. This subject will be again referred to later.

Ætiology.—The causes of post-nasal growths may be considered under the heads of:—A. Predisposing, and B. Exciting. Under the former the following must be considered :—

- A. 1. Heredity.
- 2. Anatomical peculiarities.
- 3. Climate.
- 4. Struma and congenital syphilis.

Whilst the following may be considered as exciting causes :—

- B. 1. Frequent catarrhs.
- 2. Exanthemata.
- 3. Diphtheria and septic sore throat.
- 4. Whooping cough.

A. Predisposing causes—1. Heredity.—From the fact that many children in one family often suffer from adenoids, and that one frequently finds a history suggestive of them in the parents, in whom also enlarged tonsils are sometimes seen; and further from the fact that certain races, the Jews for example, are especially prone

to them, it may be assumed that heredity plays a certain part as a predisposing cause. Moreover catarrhal conditions, I think, certainly run in families, so much so that one may fairly suggest a catarrhal diathesis of an hereditary nature in the same way as certain families are said to be of an arthritic diathesis. Members of a family of a catarrhal diathesis are especially prone to simple mucous or muco-purulent inflammation of the mucous membranes wherever situated, both acute and chronic, and in so far as "colds in the head" may be considered as an exciting cause of adenoids, the catarrhal diathesis may be considered as a predisposing cause of an hereditary nature.

2. Anatomical peculiarities.—The anatomical peculiarities, some of which are hereditary, and which, as pointed out by MacDonald, play an important part in the production of these growths, are the following :—

Deflected septum.

Enlarged inferior turbinated bodies.

High and narrow arch to palate.

V-shaded palate.

Cleft palate.

Small anterior nares—narrowed alæ.

Contracted nasal fossæ.

All these peculiarities act in one and the same way, namely, by causing nasal stenosis. That stenosis of the anterior part of the nose is likely to cause post-nasal growths is shown by MacDonald's experiments, which prove that where there is obstruction there is necessarily diminished air tension behind it during nasal inspiration, and consequently hyperæmia from over-filling of the blood vessels, which, if long continued or often repeated, would of course lead to hypertrophy of the parts. The ætiological importance of these anatomical peculiarities will be further considered in the next chapter,* and their significance will be more clearly understood when the fact is grasped that respiration is nasal and not buccal during sleep, even though there be considerable nasal obstruction.

3. **Climate.**—Damp and cold climates certainly predispose to post-nasal growths. They

* See p. 51, *et. seq.*

are comparatively rare in warm equable or dry regions.

4. **Struma and Congenital Syphilis.**—Struma is supposed by some to be another predisposing cause, but facts show that children of otherwise robust constitutions are equally liable to them. Congenital syphilis on the other hand seems really to be a predisposing cause as adenoids are especially common in those suffering from this disease. Syphilitic infants are especially prone to nasal catarrhs, in fact they are born into life with the “snuffles,” which is a catarrhal condition, and in this fact lies, I think, the explanation of the concurrence of congenital syphilis and post-nasal growths. In the matter of treatment it is well to remember this association of troubles, for often the symptoms of adenoids do not clear up after operation unless anti-syphilitic remedies are exhibited, and disappointment to all concerned may thus result.

B. Exciting Causes—1. Frequent Catarrhs.—Of the exciting causes constant cold-catching is of by far the greatest importance, and certainly is much the most frequent of the immediate

causes of the over-growth of lymphoid tissue in the post-nasal space. Catarrh of the nose operates in a twofold manner; firstly by causing some stenosis in the anterior part of the nose, and secondly by keeping the post-nasal space bathed in muco-purulent discharge which is intensely irritating.

We have already seen how stenosis causes hypertrophy behind the seat of obstruction, and constant irritation from the presence of a muco-purulent discharge would also cause first hyperæmia, and then hypertrophy of the tissues, and it must be remembered that in children lymphoid tissue, of which these growths are almost entirely composed, most readily of all structures takes on rapid growth.

Both the anterior stenosis and the irritation of the muco-purulent discharge are greatly increased by the infant being quite unable to blow his nose and thus free the passages. Amongst the poorer classes frequent colds are especially common, moreover they are utterly neglected and no attempt is made at cleansing the nostrils. Thus infants are constantly seen with a thick

discharge hanging out of the anterior nares, and if the pharynx be examined, muco-pus can be observed running down from the post-nasal space. Let these children be watched for a year or two and they will assuredly be found to develop a greater or less quantity of post-nasal growths. In relation to this question dentition might have been mentioned as a predisposing cause of adenoids, for amongst all classes this process is generally associated with a catarrhal condition of the nasal passages, which if neglected tends to become chronic and so to produce conditions favourable to the development of hypertrophies in the naso-pharynx. From careful observation of infants amongst the poor—I feel sure that constant nasal catarrhs are a frequent source of the trouble under discussion, and as stated above, I believe this catarrhal condition runs in families. I have frequently seen in cottages four or five children all under about six years of age, and all with profuse chronic catarrhs, dirty noses, and excoriated lips, whilst amongst other families all the children will have clean noses. Amongst

the more educated classes too, colds are very much neglected in children, and sufficient care is not bestowed on the cleansing of the nostrils, and I do not think parents realize sufficiently the great importance of teaching their children to blow their noses themselves. It is a very difficult thing to teach a child, and is consequently apt to be neglected. Finally it must be remembered that frequent cold catching and a profuse nasal discharge are often also a *result* of post-nasal growths.

2. **Exanthemata.**—Of the other exciting causes exanthemata must be placed next in order of frequency—and of these measles and scarlet fever most commonly give rise to adenoids. Most cases of purulent middle ear catarrh, so frequently met with as a sequel of scarlet fever, are probably due to the rapid development of post-nasal growths. I have below given the details of a case of septic sore throat where only five weeks sufficed for the development of growths followed by purulent otitis media, and I have seen much the same in cases of scarlet fever, though in these I cannot say so definitely

that there were no pre-existing growths in the naso-pharynx. At all events in ear-trouble following exanthemata it is important to at once examine for adenoids, removing them if found, and not to rest content with treating the "discharge" from the ear. If this were done systematically I feel sure that the answer to the question "how long have you been deaf?" would not so frequently be "since scarlet fever or measles in childhood."

3. **Diphtheria.**—Again nose and ear troubles can often be dated from an attack of diphtheria or septic sore throat, and I have seen one case where the latter was undoubtedly the starting point of post-nasal growths. A child $2\frac{1}{2}$ years old, who up to the time of illness had had no signs or symptoms of nose trouble, was taken ill with a sore throat of doubtful character, which was finally considered by Drs. Goodhart, MacDonald and myself as of a septic nature, but not diphtheria. It ran a very sluggish course and the child was in bed five weeks with constant relapses. The temperature was considerably raised most of the time. Towards the end

of the illness there were marked signs of nasal obstruction, especially at night when inspiration was most distressful, noisy and insufficient. The marked recession of the anterior triangles of the neck clearly showed that the obstruction was not laryngeal. The tonsils also were now very much enlarged, but no longer acutely inflamed. Shortly the child began to complain of ear ache, and on examination an acute otitis media was found. Both membranes were somewhat retracted at first, but soon fluid collected in the right tympanic cavity and the membrane on that side began to bulge. Pus was evacuated by paracentesis. Suppuration did not occur in the left ear. I advised that the child should be put under the influence of chloroform, the tonsils removed and the post-nasal space explored, and should there be growths that they also should be removed. Dr. MacDonald kindly saw the case with me again and endorsed this opinion—so we there and then operated. The tonsils were removed and on examining the nasopharynx the space was found to be almost occluded by a large mass of adenoid growth.

This also was removed. From this date the child quickly recovered, and was soon up and about again. The ear trouble also rapidly subsided, the discharge ceasing in two or three days, not the least impairment of hearing being left. Two years afterwards he had a similar throat attack, which was thought by some to be diphtheria, but on this occasion there was no development of post-nasal growths. I mention this case as it clearly shows the starting point of the growths in this particular instance at any rate, and how rapidly they may develop. Another point of interest is that the child's appearance now would never lead one to suspect that he had ever suffered from post-nasal growths. Their prompt removal saved him from this disfigurement.

4. **Whooping-cough.**—Lastly, parents so often date the origin of nose trouble from the time their children had whooping-cough, that I think one may fairly look upon the latter as an exciting cause of post-nasal growths.

Pathology.—Löwenberg was the first to point out the true nature of these growths, and to show that they were a simple hypertrophy of the

normal lymphoid tissue found in the pharyngeal vault, and Bosworth in consequence abandons the terms "post-nasal growths" and "adenoid vegetations," and adopts that of hypertrophy of the pharyngeal tonsil, which is perhaps a better and more accurate term. Microscopically it is found that the growth is covered with a layer of columnar ciliated epithelium, that its bulk is composed of lymphoid tissue, whilst there is very little excessive development of fibrous connective tissue, in which latter point alone it differs from an enlarged tonsil in which from irritation of food, &c., the fibrous tissue becomes exaggerated and the growth consequently is of a firmer consistency. Adenoid vegetations, post-nasal growths or hypertrophy of the pharyngeal tonsil consist then of an hyperplasia of the lymphoid tissue which normally exists in the naso-pharynx.

Signs, Symptoms and Complications.—It is difficult to separate these into classes and to say which is a symptom and which a complication. I shall, however, first describe the four most prominent features of the trouble, namely:

1. The peculiar facies.

2. The mucous discharge.
3. The speech.
4. The buccal respiration.

And then discuss the objective signs seen in the nose, naso-pharynx, and pharynx; and finally treat of all else as complications.

Typical face.—When a case of post-nasal growths first comes before one, the formation of the face at once attracts attention, especially if the trouble is of at all long-standing; but though the characteristic appearance may be taken almost unhesitatingly as a positive sign of their existence, present or past, the reverse is by no means true. In slight cases, in those of recent date, and also in those where the stenosis is not great, there may be very little in the appearance to suggest the diagnosis. The typical facies is most often seen in children between eight and sixteen years of age and consists essentially in :—

1. A broadening of the bridge of the nose.
2. A depression on each ala of the nose at the junction of the superior and inferior lateral cartilages.

3. Narrow ill-developed nostrils.
4. Open mouth.
5. Prominent and expressionless lips.

All the above combined give the child a strikingly stupid, semi-idiotic look. Luckily if the source of trouble is removed early enough this appearance either never forms, or if it has formed will quickly disappear. The face again fills with light, expression, and intelligence, the mouth closes, the lips assume their normal contour and perhaps the only peculiarity left to tell the past history, will be the dimples on the sides of the nose, which generally persist a long while. Should the post-nasal growths be left to die a natural death, the type of face may be life-lasting, not to such an extent as seen in youth, but quite sufficient to render unpleasant what might otherwise have been a pretty or a handsome face. This surely is in itself an additional reason for removing the growth early.

Mucous discharge.—The next most prominent symptom is a mucous or muco-purulent discharge filling the nostrils and running down into the pharynx. It probably arises from the enlarged

glands themselves, whose functional activity is increased with their size. It is of aropy tenacious consistency, and is voided with great difficulty, especially in the very young, and besides being a distressing symptom, its presence by increasing the stenosis of the anterior nares may lead to actual increase of the growths themselves.

Speech.—The voice in these cases assumes a dull thick character, and wrong consonants are sounded, as B for P, and D for T, also B for M and D for N. This is partly due to enfeeblement of the soft palate and partly to the actual nasal obstruction.

Buccal respiration.—Buccal respiration is a fairly constant symptom. The mouth may be kept constantly open and breathing conducted through it all day, but as pointed out in the next chapter it is not so by night; or the patient may only occasionally take an inspiration through the mouth, and indignantly deny the imputation of mouth breathing. Make such a patient, however, close his mouth and walk up and down the room, and on carefully watching him it will be

found that every few moments he will take one deep inspiration through the mouth, and then continue again to breathe through the nose. This is a sure sign that there is some obstruction to nasal respiration.

Examination of nose.—On examining the anterior nares there is frequently found to be more or less tumefaction of the inferior turbinated bodies, or again, the nasal passages may be much smaller than normal, the fossæ being considerably contracted. Deflections and thickenings of the septum are also very common, and especially so when the palate is very much arched.

Posterior rhinoscopy.—Should it be possible to examine the naso-pharynx by posterior rhinoscopy the growths will be seen bulging from the vault and upper part of the posterior wall, looking like soft pads. The first thing to attract attention is the fact that the posterior choanæ and upper part of the septum cannot be properly seen, and on examining more carefully these cushions of growth are found to be obstructing the view. Their size may be roughly estimated

by noticing how much of the nasal septum is cut off from view. In appearance the growth may be smooth or may be seen as vertical ridges separated by fissures, or again, it may be more or less lobulated, but the older the patient the smoother the appearance of the growth. Thick mucous is sometimes seen hanging about the naso-pharynx, obscuring the growth.

Digital examination.—It is often difficult and sometimes impossible to obtain a view of the post-nasal space, when it becomes necessary to explore the naso-pharynx with the finger, by which means, with a very little practice, the growths can be readily recognized. The advantages of this method of examination are :—(1) It is feasible when posterior rhinoscopy is impossible. (2) The size of the growth can be correctly estimated, which is only partially possible from the view of them seen in the mirror; and (3) Their consistency can be gauged, which is of some importance in the question of treatment.

Bosworth's method.—When posterior rhinoscopy is impossible and one does not wish to submit a patient to the discomfort of a digital

examination, Bosworth advises another method of diagnosing and estimating the quantity of post-nasal growths. It consists in atomizing by means of a spray cosmoline or sweet oil, which creates a cloud of the density of smoke. If this is sprayed into one nostril it will return with almost equal force from the other if the nasal passages and naso-pharynx are quite clear. If, however, the naso-pharynx is obstructed, the return stream is much weakened, or entirely absent, according to the amount of growth. This, however, may be caused by any stenosis in the nose or naso-pharynx, and though in the vast majority of cases it will mean post-nasal growths, it cannot be taken as an absolute and certain diagnostic sign of any particular form of obstruction.

Pharynx.—On examining the pharynx the tonsils are frequently found to be enlarged. In children, if this is so, one may feel almost sure of finding enlargement of the pharyngeal tonsil also. The reverse, however, is by no means the case, for post-nasal growths often occur with normal tonsils. Or again there may be congestion of the pharyngeal pillars, and of the

soft palate and uvula. All the parts look dusky and flabby and often there is marked paresis of the soft palate. The back of the pharynx may be covered with mucus or muco-pus seen to be coming from the naso-pharynx. On the posterior pharyngeal wall there are generally some large pale soft granulations which increase in size as they approach the naso-pharynx and disappear behind the soft palate. In children this condition always means adenoids higher up: they are in fact themselves adenoids—that is hypertrophied lymphoid tissue. Lastly there is sometimes pharyngitis sicca through the growths occluding the superior and middle meatuses of the nose, and owing to respiration being entirely conducted through the inferior passage, the air is insufficiently moistened (MacDonald).

Complications of post-nasal growths.—These for the sake of convenience will be divided into (1) those which can be directly or indirectly traced to the persistence of nasal respiration in spite of difficulties, and (2) those depending on other causes. Under the first head may be placed:—

1. Broken sleep.
2. Deficient aëration of the blood, causing :
 - (a) Anæmia and general debility.
 - (b) Malnutrition and stunted growth.
 - (c) Headaches, giddiness and loss of memory.
 - (d) Stupidity and inaptitude for mental exertion and perhaps, epilepsy, asthma and chorea.
3. Snoring.
4. Deformities of the chest.
5. Intra-nasal hypertrophies and post-nasal growths.

Under the second head come :—

1. Deafness.
2. Chronic laryngitis.
3. Frequent colds.
4. Cough.
5. Laryngismus stridulus.
6. Night sweats.
7. Epistaxis.
8. Loss of sense of smell.
9. Stammering.
10. Hay fever and hay asthma.
11. Incontinence of urine.

CHAPTER II.

NASAL BREATHING IN NASAL OBSTRUCTION AND THE COMPLICATIONS PRODUCED THEREBY.*

Respiratory Instinct.—Dr. Greville MacDonald has observed “that the instinct of nose breathing appears to assert itself in spite of sometimes great difficulties, and especially during sleep.”† Before this, it had always been thought that in nasal obstruction buccal respiration took the place of nasal, both during sleep and during waking hours, and many symptoms and complications of these cases have been explained, I think wrongly, as the result of buccal breathing; whilst other complications, though recognised as coincident to obstruction of the nose, have not been satisfactorily explained at all.

In order to corroborate the above quoted statement, Dr. MacDonald suggested that I

* Reprinted from “St. Bartholomew’s Hospital Reports,” vol. xxix.

† “Diseases of the Nose,” 2nd edition, p. 251, 1892.

should make some observations on the method of breathing during sleep in this class of cases, and I will take this opportunity of thanking him for much kind help.

The results of these observations have been to convince us that in the vast majority of cases the air enters the lungs almost entirely through the nose during sleep, however great may be the difficulties, and though the mouth be kept wide open. Starting from this standpoint, many symptoms and complications of nasal obstruction appear in a new light and become more readily intelligible.

Method of Investigation.—The means employed to determine whether the current of air was entering through one or both nostrils or through the mouth was simply by thinning out a small piece of cotton-wool, twisting up one end and making the other spatulate, but all so delicate that the slightest breath of air would move it. This broader end was held first in front of the mouth and then in front of each nostril, and its movements readily showed through which passage or passages the air was

entering; and the amount of air entering each passage could in great measure be gauged by the force with which the cotton-wool was blown from and sucked towards the opening of the passage.

On examining a number of cases in this way, it soon became evident that during sleep respiration was at any rate partly nasal, and in the great majority of cases entirely so, unless the obstruction was complete. Most of them, as will be seen in the annexed table, breathed wholly through the nose, however great the struggle, others partly through the nose and partly through the mouth, whilst very few adopted buccal respiration altogether.

Distress during Sleep.—In a bad case of post-nasal growths it is distressing to watch the little patient fighting to breathe *per vias naturales* during sleep, and one wonders that more damage is not done to the general health than actually takes place. In some cases indeed so little air enters the lungs for minutes together, that one is beginning to feel quite uncomfortable, when nature's demand for air asserts itself, and the

patient half wakes, tosses about, and takes one or two deep inspirations through the mouth, and again falls off into troubled sleep and commences the struggle once more. This sequence of events repeats itself every five minutes, and is only varied by the child occasionally getting rather less air than usual, when he starts from his sleep in a fright and cries, and is sometimes slightly delirious.

This distress during sleep has of course often been pointed out before, but what I wish to insist upon is the fact that it is caused by endeavouring to breathe through an obstructed nose, and is in no way connected with buccal respiration. Far better would it be for the child were he to breathe through his mouth, and that the blood should get sufficiently aërated, than that his all-important sleep should night after night be thus disturbed. There indeed seems to be a very overpowering instinct in favour of breathing through the nose, which during sleep, when the will power is suspended, strongly asserts itself. Certainly all animals while in a state of rest adopt nasal respiration; and even

those animals, such as pug dogs and bull dogs, whose faces have undergone incurvation to enable them to breathe whilst hanging on to their prey, and whose nasal passages have thus been thrown out of the straight line, and sometimes perhaps diminished in capacity, resulting in some obstruction, resort to nose breathing whilst asleep, when very often their difficulties and marked snoring remind one of the breathing of children with post-nasal growths. Whilst awake patients, unconsciously perhaps, elect, for the sake of comfort, to breathe through the mouth, and thus there are the evils of obstructed respiration and insufficient aëration by night, and those of buccal breathing by day.

Analysis of Cases and Deductions.—The following is a list of fifty cases on which observations have been made. It will be seen that they are all cases of post-nasal growths, and are consequently nearly all young patients. I have, however, examined several adults suffering from other forms of nasal obstruction, with the same results, as can be drawn from the cases set forth below. In one case the respiration was buccal ;

she was twenty-five years of age, and had some post-nasal thickening, and both nostrils were so absolutely blocked with polypi that whilst awake she could get no air to pass in or out through the nostrils ; but with this exception respiration was found to be almost invariably nasal. So I think one may justly state that neither the particular form of obstruction nor the age of the patient makes any difference to the fact that during sleep nature insists on nose-breathing, if it is in any way possible (see Table).

From the Table it may be gathered :—

1. That 43 patients kept the mouth open during sleep—that is, 86 per cent., but in six, or twelve per cent., it was closed, and in one case, or two per cent., it was sometimes open and sometimes shut.

2. That respiration was entirely nasal in 41 cases, or 82 per cent., and entirely buccal in only one case, or two per cent. ; that it was partly nasal and partly buccal in eight cases, or sixteen per cent., and that in five of these latter cases, or ten per cent. of the whole, inspiration was nasal and expiration buccal. These five

TABLE OF CASES OF POST-NASAL GROWTHS.

CASE.	SEX.	AGE.	MOUTH OPEN OR SHUT.	RESPIRATION.	SNORING.	BREATHING.	RECESSION OF SOFT PARTS.	REMARKS.
1	M.	4	Open	Nasal	Loud	..	Marked of an- terior triangles of neck and epister- nal notch.	Three days after operation mouth was kept shut, and snoring ceased.
2	F.	13	Open	Nasal	..	Noisy	None	.. ..
3	M.	16	Open	Nasal	..	Heavy	..	.. ..
4	M.	7	Open	Nasal	Loud	..	Slight of anterior triangles.	Great restlessness.
5	F.	5	Open	Nasal	Very loud	..	Slight of anterior triangles.	.. ..
6	F.	23	Shut	Nasal	..	Quiet	..	Very few post-nasal growths. Some laryn- gitis.
7	M.	16	Open	Nasal	..	Quiet	..	.. ..
8	F.	6	Open	<i>Inspiration</i> buccal. <i>Expiration</i> chiefly so; slightly left nasal.	Very loud	..	Recession of soft parts very slight.	Very restless. Chronic bronchitis. Complete obstruction of right nostril, and almost complete of left. Thick purulent discharge.
9	F.	9	Open	Nasal	..	Quiet	..	.. ..
10	F.	10	Chiefly open	Nasal. <i>Expiration</i> sometimes buccal.	Loud	..	..	Snoring was greatly increased when the mouth was closed.
11	M.	18	Open	<i>Inspiration</i> nasal. <i>Expiration</i> buccal.	..	Very heavy	..	A great mass of post- nasal growths.
12	M.	13	Open	Nasal	..	Noisy	..	Some enlargement of thyroid.
13	F.	6	Shut	Nasal	..	Quiet	..	Slight case.
14	M.	8	Open	Nasal	..	Quiet	..	.. ..
15	F.	7	Shut	Nasal	..	Heavy	..	.. ..
16	M.	11	Open	<i>Inspiration</i> nasal. <i>Expiration</i> buccal.	..	Very noisy	..	Well-marked case.
17	M.	7	Open	Right nasal.	..	Heavy	..	.. ..
18	M.	13	Shut	Nasal	..	Quiet	..	.. ..
19	M.	2	Open	Nasal	Loud	..	Of anterior tri- angles.	.. ..
20	M.	16	Open	Nasal	Marked	..	..	.. ..
21	M.	6	Shut	Nasal	Occasional	..	..	.. ..
22	F.	11	Open	Nasal	..	Very heavy	..	Enlarged tonsils.
23	F.	15	Open	Nasal	..	Noisy	..	.. ..
24	F.	7	Open	Nasal	..	Noisy	..	.. ..
25	M.	20	Open	Nasal	..	Very noisy	..	Deafness since measles at 2 years

TABLE OF CASES OF POST-NASAL GROWTHS (*Continued*).

CASE.	SEX.	AGE.	MOUTH OPEN OR SHUT.	RESPIRATION.	SNORING.	BREATHING.	RECESSION OF SOFT PARTS.	REMARKS.
26	F.	6	Open	Nasal	..	Heavy	..	.. ..
27	F.	6	Shut	Nasal	..	Quiet	..	.. ..
28	F.	4	Open	Nasal	..	Noisy	..	.. ..
29	F.	8	Open	Nasal	..	Heavy	..	.. ..
30	M.	13	Slightly open	Slightly nasal, largely buccal	..	Very heavy	..	.. ..
31	F.	15	Open	Buccal	..	Heavy	..	Very marked case.
32	M.	15	Open	Left nasal	..	Heavy	..	Enlargement of inferior turbinated bodies.
33	F.	12	Open	Nasal	..	Quiet	..	.. ..
34	F.	13	Open	Nasal	..	Quiet	..	.. ..
35	M.	2 $\frac{1}{2}$	Open	Nasal	..	Very noisy	Some recession	Enlarged tonsils.
36	F.	4	Open	Left nasal	..	Very noisy	..	.. ..
37	M.	8	Open	Nasal, chiefly left	..	Very noisy	..	.. ..
38	F.	8	Open	Nasal	Slight	..	..	.. ..
39	M.	11	Open	Chiefly nasal, partly buccal	Marked	..	Slight of anterior triangles	.. ..
40	M.	2	Open	Nasal	..	Very noisy	Marked recession	Very restless. Enlarged tonsils.
41	F.	6	Open	Nasal, chiefly right	Marked	..	Some recession	Inferior turbinated enlarged. Asthma.
42	M.	10	Open	Nasal	Marked	..	..	Enlarged tonsils.
43	F.	7	Open	Nasal	..	Noisy	..	.. ..
44	F.	7	Open	Right nasal	Marked	..	Slight	Left nostril entirely closed owing to traumatic deviation of septum.
45	M.	4 $\frac{1}{2}$	Open	<i>Inspiration</i> nasal. <i>Expiration</i> buccal.	Marked	..	Marked	A great mass of post-nasal growths and much catarrh.
46	F.	6	Open	Right nasal	..	Heavy	..	Deviation of septum to left.
47	M.	3 $\frac{1}{4}$	Open	Nasal	..	Noisy	Some recession	Enlarged tonsils.
48	M.	4 $\frac{3}{4}$	Open	<i>Inspiration</i> nasal. <i>Expiration</i> buccal.	Snore occasionally	Very noisy	Marked recession	Enlarged tonsils. Very restless. Pigeon-breast in the process of formation; has been noticed a year, and is getting worse.
49	M.	9 $\frac{1}{2}$	Open	Nasal	..	Heavy	..	Enlarged tonsils.
50	M.	2	Open	Left nasal	..	Heavy	..	Tonsils slightly enlarged.

were all bad cases, and will be alluded to in discussing snoring.

3. That there was real snoring in 14 cases, or 28 per cent., heavy or noisy breathing in 27 or 54 per cent., and quiet breathing in nine, or 18 per cent. These latter were all slight cases.

4. That there was recession of the anterior triangles of the neck and other yielding structures in 13 cases, or 26 per cent. Observations were made chiefly on the anterior triangles, because they are most easily watched without disturbing the patient ; but if recession is found here, there must necessarily be more or less below.

The conclusions to be drawn from these cases are evidently that the majority (86 per cent.) of cases of nasal obstruction sleep with the mouth open, though in 82 per cent. of these the respiration is entirely nasal, and in 16 per cent. partly so ; that this is in spite of difficulties, as indicated by the snoring or heavy breathing found to exist in 82 per cent. ; and that as shown by the recession of the soft parts, 26 per cent. are exposed to the risks of getting deformities of the chest.

The last four cases are especially interesting as all being sons of one family. They were all born and bred in a low-lying damp place, and all suffered from severe and continued catarrhs as infants. The parents are healthy, and show no signs of having had post-nasal growths when young. The mother, however, had her tonsils removed when grown up. The case with pigeon-breast (No. 48) first came under my notice when fifteen months old. The post-nasal space was then crammed with growths, and there was most profuse nasal catarrh. His breathing was most distressing, being as far as possible nasal, and there was marked recession of the chest, and the child's general health was much depressed. At eighteen months I operated, making a thorough clearance of the post-nasal space (using Löwenberg's forceps), which for a time gave great relief; but unfortunately the catarrhal symptoms did not clear up, partly because the difficulties of applying local remedies in one so young were so great that the mother neglected them. Six months after the operation the post-nasal space was evidently filling again,

and the child's breathing at night once more became laboured, and at two and a half years he was as bad as ever. At three years I suggested repeating the operation, but the parents, perhaps naturally, considering the result of the first operation, withheld their consent; and since then I have been able to watch the conformation of the chest gradually altering until now, when it is unmistakably pigeon-shaped. On every occasion that I have tested the breathing at night, inspiration has been nasal, and generally expiration buccal, except just after the operation. I mention this case in detail as it shows, firstly, the necessity of treating catarrhal conditions after operating on very young patients; and secondly, the gradual deformation of the chest due to nasal stenosis. There is a fifth son in this family, eight years of age, who, according to his father's statement, sleeps noisily and with open mouth, and has enlarged tonsils, and probably post-nasal growths. As yet I have had no opportunity of examining him myself.

Application of Conclusions.—We must now consider how the conclusions drawn from the

above table of cases will help to elucidate and explain certain symptoms and results of post-nasal growths and indeed of other forms of nasal obstruction.

Among the symptoms and consequences of post-nasal growths the following are some of the commonest, and those with which we are concerned in the present chapter :—

Restlessness at night.

Insufficient aëration of the blood.

General debility, malnutrition, and retarded growth.

Anæmia, headaches, giddiness, loss of memory.

Heaviness and lassitude on waking.

Stupidity and inaptitude for mental exertion.

Snoring.

Deformities of the chest.

Intra-nasal hypertrophies.

Asthma.

Epilepsy.

Nocturnal Frights.—With regard to the first symptom, restlessness at night, with nightmares, waking up in frights, &c., these are all easily explained, as indeed has already been done

above by the fight for breath through the nose. An adult patient who, both from her physiognomy and from atrophied remains seen by posterior rhinoscopy, evidently had a mass of post-nasal growth when young, states that for years she had one and the same dream night after night, namely, that she had been buried alive and was struggling to get free. From this dream she used to wake in the utmost terror, and perhaps go to sleep and dream it again. Doubtless she was in truth fighting for breath, and the dream was more of an actuality than most.

Defective Aëration.—Next let us take defective aëration of the blood. Supposing it to be a fact that patients with nasal obstruction breathe through the mouth by night as well as by day, it seems difficult to explain why there should be deficient aëration of the blood, for it is as easy to breathe through the mouth as through the nose, always supposing the tonsils to be normal. In fact, if people who are “out of training” run or take any violent exercise, they always adopt buccal respiration when they

are getting out of breath, because in this way more air enters the lungs, and with greater rapidity and facility. Athletes recognise this, but they also realise that for long-continued exertion, such as a three mile race, air warmed and moistened by passing through the nostrils is better than greater quantities of unwarmed air passing to the lungs by the mouth, and therefore, knowing the temptation will be to adopt buccal respiration, they carry a round pebble in the mouth to ensure keeping it shut. Many animals too, especially the dog, adopt buccal respiration when in exercise. In short, there is no mechanical hindrance to the entry of air through the mouth to the lungs, but, on the contrary, it has an easier passage than through the nostrils. Therefore it is not during the day, when buccal breathing is going on freely, that insufficient aëration takes place, but at night, during sleep, when instinct insists on nasal respiration, however difficult it may be.

In the same way, given constant buccal breathing, it is difficult to explain many other conditions allied to those produced by defective

aëration, and so often found to exist with nasal obstruction, namely, general debility, malnutrition, stunted growth, anæmia, headaches, giddiness, loss of memory, lassitude on waking in the morning and wearing off as the day goes on, stupidity and inaptitude for mental exertion, &c. It has long been thought that most of these symptoms were due to interference with respiration, and not, as once suggested, to reflex irritation; but with buccal respiration, in what way is breathing interfered with? On the other hand, when it is recognised that all through the night the patient is struggling for breath through an obstructed nose, the above symptoms can be readily understood. For not only is there a deficiency of oxygen supplied to the lungs, and so to the blood during inspiration, but expiration is equally obstructed and deficient, and thus the blood must become surcharged with carbonic acid gas. Moreover, the retention of CO_2 in the blood is increased by the very lack of oxygen in inspiration; for we must remember that the excretion of CO_2 and the absorption of oxygen are not due to the purely mechanical process of dif-

fusion entirely, but that chemical processes play a large part therein. The free supply of oxygen, and so the plentiful formation of oxyhæmoglobin, undoubtedly helps forward the removal of the CO_2 , which is loosely combined with the salts of the plasma, and also, indeed, that portion of CO_2 which is more firmly combined. And further, there are in expired air certain organic substances to which the odour of breath is due, and some of which are undoubtedly poisonous, either in themselves or on undergoing decomposition, when they give rise to substances in all probability very like ptomaines. In any case, these organic substances have a very deleterious action, as is shown by the fact that air artificially prepared with a one per cent. excess of CO_2 , and a corresponding diminution of oxygen, does but little harm when breathed, but a similar air produced by expiration is highly injurious, producing headache, languor, and a sense of oppression.* The organism may adapt itself to such a vitiated atmosphere and escape these immediate symptoms, but nevertheless

* *Vide* Foster's "Text-Book of Physiology," 5th edit.

there follows a depression of all the vital functions, which must be injurious if long continued or often repeated. Similarly, in obstructed nasal respiration, the exchange of air in the lungs being very slow and insufficient, the blood must get loaded with an excess of CO_2 , and contaminated with organic impurities which may even have undergone decomposition whilst within the alveoli of the lungs. The anæmia and general debility of these cases is very comparable to similar cases amongst factory girls who work in close, ill-ventilated rooms, where oxygen is deficient, and where CO_2 and other impurities are in too great an abundance.

Therefore, we see that persistence in nasal breathing, causing a want of oxygen on the one hand, and an excess of CO_2 and poisonous organic substances on the other, will account for all these symptoms. To the want of oxygen may be ascribed the wasting, stunted growth, and general malnutrition; and to poisoning by CO_2 and other products of expiration, the headaches, giddiness, loss of memory, heaviness and inaptitude for mental exertion, which are indeed

recognised symptoms of slow carbonic acid gas poisoning. It is very significant that all these symptoms are most severe on waking in the morning after hours of obstructed nasal breathing, and that they wear off as the day goes on, after the patient has resorted to buccal breathing, and thus taken in a fresh stock of oxygen and expelled the surplus carbonic acid. In cases of post-nasal growths the stunted growth is often very marked, and frequently it is marvellous how a child will spring up rapidly on removing the obstruction, thus allowing a free supply of air by night as well as by day.

Snoring.—Next as regards snoring—not a very important matter, but one requiring some explanation. It has always been attributed to buccal breathing, the air being supposed to impinge on the lax velum, causing it to vibrate. Now amongst the cases under observation who were breathing through the nostrils, many of them undoubtedly snored, whilst there was heavy noisy breathing in nearly all; yet the piece of cotton-wool showed no signs of any air entering through the mouth, or, if there has been some,

it has only moved the cotton-wool so slightly that it seemed impossible that it should be sufficient to cause the soft palate to vibrate noisily by impinging on it ; this would seem to require a considerable blast of air. In these cases, therefore, snoring is undoubtedly produced through the nose. I will go further, and say that it is almost always so produced, if not always.

The easiest way to produce artificial snoring, so to speak, is to lie on one's back with the head low and well thrown back and the mouth open, and then to breathe through the nose fairly vigorously. In this way it is possible to produce a large volume of sound of a typically snoring character, and it is under these circumstances that one finds people snoring the most in sleep. On the contrary, put yourself in the same position, and breathe ever so hard through the mouth, and you will find it extremely difficult to produce any sound which can be called a snore, unless indeed you make a very distinct voluntary effort to do so. MacDonald too has remarked, "that it is worthy of note that snoring

has not the same significance in adults as in children, since many snore with closed mouth." This certainly is so ; and further, the few cases I have examined of adults with normal nasal passages, who were sleeping with open mouth and snoring loudly, were breathing through the nostrils. Thus it seems that neither in health nor disease can snoring be explained by the indrawn current of air entering through the mouth and impinging on the velum.

Then what is the cause of snoring, and why should it occur more frequently in cases of nasal obstruction than in healthy people ?

It is undoubtedly produced by vibration of the soft palate, but the air does not impinge on it through the mouth, but through the nose. During sleep all the voluntary muscles are relaxed, and with them those of the soft palate, and, as before stated, the position most favourable to snoring is lying on the back with the mouth open, the head low and well thrown back. Now in this position the soft palate, devoid of all muscular action, would obey the laws of gravity and fall far back towards the posterior wall of

the pharynx, and would so meet a current of air entering through the nostrils, and would thus be easily made to vibrate. This is what actually happens, to a greater or less extent depending on how far physiological relaxation of the soft palate takes place during sleep; and this again depends on how deep the sleep is; the deeper the sleep the greater tendency is there to snore. Some people only snore after a big dinner or an excess of alcohol, and this is because under these conditions sleep is deeper and muscular relaxation greater.

From this it is easy to explain why people with nasal trouble are more prone to snore than those with healthy nasal passages. It is well known that in most cases of diseases of the nose, especially in post-nasal growths, and whenever there is much post-nasal catarrh, the soft palate is paretic, and hangs down away from the posterior wall of the pharynx whilst the patient sits for examination. Now it would as readily fall back towards the posterior wall on the patient assuming the recumbent position, and so would lead to snoring were the patient

breathing through the nose, but one may add rather the reverse were there buccal respiration. As a further proof of this point, it may be noted that the addition of an extra pillow will very frequently stop snoring in adults. By raising the head, the soft palate would fall forward, and would thus be removed from the direct line along which the air travels in nasal respiration.

In cases of post-nasal growths, where the naso-pharynx is blocked by adventitious tissue, the soft palate would sometimes come in actual contact with the growths, thus producing a condition most favourable to snoring. Again, in other cases, where the growths are large and the paretic condition unusually pronounced, the soft palate may act as an efficient valve, allowing some air to enter through the nose, but not admitting of nasal expiration; in fact, the more the expiratory blast presses on the soft palate in its attempt to escape by the nose, the tighter would it press it against the mass of post-nasal growths, thus rendering nasal expiration quite impossible. On reference to the list of cases, it will be seen that in some few examples, where

the obstruction was considerable, inspiration was nasal and expiration was buccal. This valve-like action of the soft palate, impinging on the new growths, seems to explain this fact, which requires some elucidation, seeing that in cases of slight nasal stenosis expiration is always easier than inspiration.

An open mouth has been taken to mean mouth-breathing, and it might be asked why the mouth should be open if it is not for the purposes of respiration? Many people with no nasal trouble, who keep the mouth shut when awake, certainly sleep with it open, but this again may be explained by muscular relaxation. The jaw drops in death, and so it tends to do in sleep. Yet it is hard to understand why this should almost invariably be so in people with nasal obstruction, unless indeed it be from habit contracted during their waking hours.

Chest Deformities.—Next let us consider deformities of the chest. There are two with which we are concerned, namely :—(1) The transverse constriction of the chest, or Harrison's furrow, and (2) pigeon-breast, the latter being

nearly always accompanied by the former. The cause of both these deformities is the same, and is described by Dr. Gee as being "a long-existing or frequently-recurring impediment to free inspiration while the ribs are plastic—that is, during childhood, and especially when they are preternaturally yielding—that is, when rickety."* These conditions are found typically developed in children with post-nasal growths.

Dupuytren long ago pointed out (in 1828) the frequent concurrence of enlarged tonsils and pigeon-breast, after which it was presumed that enlarged tonsils interfered with respiration, and so caused this deformity. This, however, could only be so if patients were to adopt buccal respiration, which they do not do in an uncomplicated case. Even in acute tonsillitis, as observed by MacDonald,† where the enlargement may be very much greater than is ever seen in chronic cases, patients almost always persist in nasal respiration; and just as the idea of chronically enlarged tonsils pressing on the

* Gee's "Auscultation and Percussion."

† "The Forms of Nasal Obstruction," p. 63.

Eustachian tubes and causing deafness has had to be abandoned, so the idea of their obstructing nasal respiration must also be given up. Enlarged tonsils therefore cannot be considered the cause of pigeon-breast or Harrison's furrow. The truth is, that in children enlarged tonsils are all but invariably accompanied by post-nasal growths, and these latter give rise to all the symptoms, complications, and sequelæ formerly attributed to enlarged tonsils, and amongst them deformities of the chest.

Now to return to the old argument, it would be difficult to explain how pigeon-breast should occur in cases of nasal stenosis, if buccal respiration were constantly resorted to, for, as has been explained above, this method of breathing is even freer than normal nasal breathing. But when once the fact is grasped that children with post-nasal growths try to breathe through the nostrils during sleep, it becomes very evident why deformities of the chest should occur. On watching them, one is struck in many cases by the great amount of recession. Starting with the anterior triangles of the neck, all the yielding

structures surrounding the air passages and the lungs recede during the laboured inspiration through the nostrils, and one can almost see a Harrison's furrow and pigeon-breast in process of formation. At first sight, indeed, it seems curious that deformities are not of more frequent occurrence than is actually the case. We must remember, however, that one does not often find pigeon-breast in cases of only post-nasal growths, there is nearly always enlargement of the tonsils as well. This is due to the fact that the latter, if at all excessive, cause some impediment to buccal respiration, and consequently there is a constant source of obstruction to the entry of air both by night and by day—by night in the nose, when nasal respiration is going on, and by day in the mouth, when buccal breathing is adopted. In uncomplicated cases of post-nasal growths the free and easy mouth-breathing by day apparently counteracts the difficulties at night.

In passing, it may be noted that the recession of the anterior triangles of the neck is characteristic of nasal obstruction, and may be useful

as a diagnostic sign as to whether recession of the chest is due to obstruction of the larynx or the nose, if ever such a point should arise.

To recapitulate this question of deformities :— Enlarged tonsils alone are not sufficient to cause pigeon-breast, because respiration is entirely nasal and free; post-nasal growths alone but seldom cause it, because there is free buccal respiration during the waking hours; but, on the other hand, enlarged tonsils and post-nasal growths combined are a frequent source of deformities, because there is a constant impediment to inspiration.

Intra-nasal hypertrophies and nasal respiration.—Intra-nasal hypertrophies, including true hypertrophies of the inferior turbinated bodies, ecchondroses, exostoses, and deflections of the septum, all of which are of common occurrence, must next be considered. MacDonald looks upon all these conditions as mainly the result of physiological hypertrophy, and asks whether there are any special conditions in the nose leading to a greater blood supply, than is actually needed for normal nutrition. He then shows,

from most careful experiments, that wherever there is nasal stenosis, there is diminished air tension behind the seat of obstruction during inspiration, and that, as nature abhors a vacuum, this must lead to an overfilling of all the blood-vessels, which in due time would necessarily cause hypertrophies. He also repeats his observation that many people with slight or transient obstruction persist in nasal respiration, and that during sleep "the instinct of nasal breathing, even when contending with great difficulties, strongly asserts itself."*

Now it is known that in cases of post-nasal growths there is constantly some tumefaction of the inferior turbinated bodies, that there is often a history of frequent colds in the head preceding the growths, and that the anterior nares are frequently small and sometimes malformed. All these conditions would produce some stenosis in the front part of the nose, and nasal breathing would assuredly cause diminished air tension behind the seat of the obstruction, and would so lead to overfilling of the blood-vessels for many

* "Diseases of the Nose," 2nd edit., pp. 18-26.

hours together night after night, and so to hypertrophies. In children the structure which most readily becomes hypertrophied is adenoid tissue, of which post-nasal growths are composed. The fact that in nasal stenosis respiration is nasal and not buccal, as shown by the above table, adds great support to this theory of intranasal hypertrophies, and has an important bearing on the causation of post-nasal growths. The propounder of the theory says that "it only remains to show that breathing is still conducted through the nose in spite of the difficulty experienced,"* in order to substantiate it, and I venture to think that this has now been done.

Epilepsy and Asthma.—The remaining consequences of nasal obstruction with which it is necessary to deal are epilepsy and asthma. These maladies have long been supposed to be sometimes directly or indirectly associated with nasal obstruction, and certainly they have been known in some few cases to clear up after removing the cause of stenosis. Various suggestions have been advanced to explain this

* Ibid., p. 251.

sequel of events, but none seem altogether satisfactory. They have been classed with other troubles, as nasal reflexes, which seems a somewhat vague way of accounting for them.

MacDonald clearly points out how hay-fever, where all the normal reflexes are exaggerated to an abnormal degree, is a true nasal reflex, and thinks we have no right to suppose the existence of pathological reflexes.* In other words, can we assume that irritation of the nose, which normally produces lachrymation, sneezing, rhinorrhœa, &c., may produce epilepsy or asthma? Given an irritable condition of the cortex, the results of experiments and clinical evidence seem to point to the fact that an attack of epilepsy or asthma may be determined by peripheral disease through reflex action—for example, by intestinal worms; but it is hard to conceive that post-nasal growths of themselves are a sufficient irritant to produce such grave disorders of the central nervous system reflexly. One would at least expect to find first the physiological reflexes, such as sneezing, lachrymation, &c.,

* "Diseases of the Nose," 2nd edit., p. 216.

marked, but this is seldom the case. Therefore we must go further afield, and consider if any other reasonable explanation can be given for the existence of these seizures associated with nasal troubles.

There is a close connection between epilepsy and asthma, and even chorea, one case of which has been reported as cured by the removal of post-nasal growths. Together with neuralgia, hysteria, and even insanity, they occur in families of neurotic history, and are interchangeable in families; they are all essentially diseases of the nervous system. Now is there any common cause in cases of nasal obstruction which could produce any one of these nervous ebullitions in a person predisposed to them?

Amongst the recognised causes of asthma, for example, are depressed general health, insufficient ventilation, and morbid conditions of the blood circulating through the nervous centres. In nasal stenosis the general health certainly becomes depressed, and owing to inefficient respiration during sleep we get the same results as defective ventilation as far as the blood is con-

cerned, namely, a deficiency of oxygen and an excess of poisonous organic matters and carbonic acid gas. Might not the circulation of blood in this condition so disturb the nerve centres as to produce one of their many disorders, according to the individual predisposition of a given patient? Or, again, if this is not sufficient in itself, is it not possible that, after hours of obstructed breathing, the blood becomes charged with products of combustion in an unoxidised condition, and that these products may act as direct irritants to the nerve centres, and produce asthma, epilepsy, or even chorea? It may be noted that these attacks nearly always occur at night in these cases, when the blood is most deteriorated owing to obstructed nasal respiration.

These remarks refer to cases complicating post-nasal growths; the asthma occurring with nasal polypi and hay fever are most probably due to direct irritation of the bronchial tubes through the inhalation of foreign particles by the mouth (MacDonald).

To recapitulate the contents of this chapter:—
In cases of nasal stenosis, respiration during

sleep is nasal and not buccal, in spite of great difficulties. This disastrous instinct to nasal breathing clearly leads to—

I. Broken sleep.

II. Deficient aëration of the blood, to which may be ascribed—

(1). Anæmia and general debility.

(2). Malnutrition and stunted growth.

(3). Headaches, giddiness, and loss of memory.

(4). Heaviness and lassitude on waking in the morning.

(5). Stupidity and inaptitude for mental exertion.

And perhaps even—

(6). Epilepsy.

(7). Asthma.

(8). Chorea.

III. Snoring.

IV. Deformities of the chest.

V. Intra-nasal hypertrophies and post-nasal growths.

Remembering, therefore, this persistence in nasal respiration despite obstruction, and the

formidable list of troublous consequences which may be directly traced thereto, it becomes of the utmost importance to free the nasal passages as early as possible, even if the only symptom be slight difficulty in breathing at night.

CHAPTER III.

DEAFNESS AND OTHER COMPLICATIONS.

1. **Deafness.**—Of the other complications of post-nasal growths ear troubles are by far the most frequent and serious. Woakes thinks that not more than about 5 per cent. of cases escape more or less ear complication, whilst Meyer found that 72 out of his 102 original cases, that is about 70·6 per cent., had some ear trouble. Whether these statistics can be held to be generally correct or not, it is nevertheless undoubtedly a fact that if carefully examined many cases are found to have incipient deafness, even though the little sufferers and their parents have failed to notice it. Therefore the hearing power should be accurately tested in every case of post-nasal growths, and carefully considered when the question of operative measures arises, especially as the deafness tends to increase, and probably will be left slightly and sometimes markedly worse after each cold the patient contracts.

Two varieties of ear trouble.—There are two aural conditions met with in cases of adenoids which we may call (1) chronic hypertrophic otitis media, and (2) chronic purulent otitis media. Probably all cases start with hyperæmia of the Eustachian tubes and tympanic cavities, the cause of which is set forth below. In some instances this hyperæmia leads to hypertrophy of the mucous membrane lining the cavities, and of the membranes, and to consequent impairment of function, which condition may be called chronic hypertrophic otitis, and in other cases the hyperæmia leads to a greater activity of the secretive glands—just as indeed the hyperæmia of the glandular tissue in the naso-pharynx leads to excessive secretion—and the cavities are soon filled with fluid, which quickly becomes purulent, and results in perforation of the membrane and otorrhœa. There is nothing unusual in the formation of pus under these circumstances. A catarrhal condition of the mucous membrane of any partially closed cavity or passage almost invariably ends in a suppurative inflammation, *e.g.*, in the vagina, urethra, and accessory cavi-

ties of the nose ; but why the hyperæmia should sometimes cause hypertrophy and sometimes hyper-secretion and formation of pus is difficult to explain. Bosworth states, that the membrana tympani becomes atrophied in cases of post-nasal growths, and in consequence is sometimes accidentally ruptured, thus admitting air into the middle ear. In this way he accounts for some cases of purulent otitis. My own experience, and, I should say, that of most authorities on the subject, leads me to think that atrophy is very rare. Hypertrophy or thickening of the membrane is certainly the usual condition met with in cases of ear trouble complicating post-nasal stenosis, and is much more readily intelligible.

Supposed causes of the otitis.—The primary cause of these two conditions is thought by some to be direct pressure of the growths on the orifices of the Eustachian tubes, whilst by others it is ascribed to the spread of an inflammatory process, (due in the first instance to the irritating presence of the growths), from the nasopharynx up the tubes to the middle ear. From

the fact that in these cases of ear trouble the membrana tympani is invariably retracted, I think it is quite safe to state positively that the deafness is due to diminished air tension within the tympanum, and not to the spreading of inflammation from the naso-pharynx, but I do not think the diminished air tension is due to direct pressure of the growths on the Eustachian orifices. I should say it is quite the exception rather than the rule to see the growths covering the mouths of the tubes, though of course it does happen in very marked instances. There are, at any rate, very many cases of post-nasal growths causing deafness where there is certainly no direct pressure on the orifices of the tubes. Therefore I think this theory will only account for a very limited number of cases. If then neither direct pressure nor the spread of inflammation will account for the ear complications in the majority of patients suffering from adenoids, is there any explanation which is universally applicable? As before stated the invariable retraction of the membranes points to diminished air tension as the immediate cause

of the deafness, and I feel sure that the true explanation of this insufficiency of air tension is to be found in the persistence of nasal respiration during sleep in spite of obstruction, and that therefore deafness ought to have been included amongst the troubles in the last chapter, and I hope to be able to make this clear.

Application of MacDonald's theories.—MacDonald's theory of the causation of intra-nasal hypertrophies, and indeed of post-nasal growths themselves, has before been alluded to, and it must now again be borne in mind. At the risk of repetition it may once more be summed up by saying that when there is nasal obstruction inspiration causes a diminished air tension behind the seat of stenosis, to equalize which all the blood vessels become over-filled, and that, as the tissues are consequently supplied with more blood than is needed for normal nutrition, hypertrophies result. Now in cases of adenoids there is diminished air tension from the naso-pharynx all down the respiratory tract to the bases of the lungs. In the throat and chest this is equalized by the falling in or rather driving in of all the

soft parts, as is seen by the recession of the anterior triangles of the neck, the sinking of the larynx and the recession of the ribs, but it must be remembered that in parts surrounded by dense bone the same method of compensation is not possible, and that instead the blood vessels become over-filled. Further, in these cases the orifices of the Eustachian tubes are nearly always behind the seat of stenosis, or at any rate behind the bulk of the obstructing growth, and consequently during nasal respiration the tubes and the cavities of the middle ear share in the diminished air tension. This is partly compensated for by the driving in of the tympanic membranes, and perhaps small portions of the tubes. In fact if the mouth is closed and the nose pinched, and then a strong inspiratory effort is made one can feel, I think, an in-drawing of the drum-skins, and perhaps portions of the Eustachian tubes.*

* I find Valsalva states that during forced inspiration, when the nose and mouth are closed, air is sucked out of the middle ear, while the tympanic membranes are ultimately drawn inwards, (Landois and Stirling's "Physiology," p. 1055).

The middle cavities of the ears and the tubes, however, are in chief part surrounded by dense bone, and therefore cannot collapse sufficiently to counteract the diminished air tension within, consequently, as under similar conditions in the nose, the vessels become over-filled with blood and a condition of chronic hyperæmia is established. This may become permanent and soon cause the chronic hypertrophic otitis described above, or the hyperæmia may cause hyper-secretion, which as we have seen is sure to lead to suppurative otitis. That the thickened condition of the drums is due to simple hypertrophy and not to an inflammatory process is greatly borne out by the fact, that after removing adenoids the hearing power quickly returns though the thickening is long lasting. This hypertrophy is often very exaggerated in cases of post-nasal growths, and yet one does not hesitate to give a fairly hopeful prognosis whereas, a similar condition in patients, where the trouble was not due to adenoids, would make one of necessity take a very grave view of the chances of recovering the hearing power, for in the latter the

thickening is due to inflammation, and is more than a simple hypertrophy.

Bosworth's explanation.—Another explanation of the diminished air tension is advanced by Bosworth. He rejects the idea of post-nasal growths causing deafness by pressure on the orifices of the Eustachian tubes, and thinks that it is due to the nasal stenosis arresting the to-and-fro current of air through the nasal passages, thus causing a stagnation of air in the pharyngeal vault, and necessarily a certain amount of rarefaction of air in that region, and consequently, I take it, an insufficient supply to the tympanum. Now undoubtedly the function of the Eustachian tube is to keep the air tension within the tympanum the same as that in the external auditory meatus, under which circumstances alone is normal vibration of the membrana tympani possible; and it is generally thought that the tube, closed whilst quiescent, only opens during the act of deglutition from the action of the tensor veli palati, otherwise called the abductor tubæ (Tröltsch), or dilator tubæ (Rüdinger).

If this be true, which no one doubts, I fail

to see why there should be any deficiency of air supply on Bosworth's reasoning; for if a person with normal nasal passages hold his nose and swallow, an excess of air is forced into the tympanum, indeed by holding the nose the pressure of air in the naso-pharynx is increased during deglutition, and upon this fact Valsalva's method of inflation is based. And further, supposing the same person hold his nose and breathe through the mouth for four or five minutes continuously, (which I presume would be long enough to allow of the air in the pharyngeal vault becoming rarefied), and then swallow, the same uncomfortable over-distension of the tympanic cavities ensues. On this showing nasal stenosis ought to increase the air supply to middle ear, rather than diminish it, and consequently I think Bosworth's explanation fails to account for the ear complications in post-nasal growths, especially when one considers how easy it is for air to pass from the mouth or pharynx into the post-nasal space during swallowing.

Persistence of nasal-breathing.—So far we have seen that diminished air tension is the

cause of ear troubles, but that neither direct pressure of the growths nor rarefaction of air in the post-nasal space can be held responsible for the intra-tympanic minus tension. On the other hand we have seen that where there is nasal stenosis there always is diminished air tension behind the seat of stenosis, and consequently in the tympanic cavities, during nasal inspiration. Now if buccal respiration be substituted entirely for nasal in cases of adenoids, I confess we have not advanced far on the road leading to a satisfactory explanation of otitis. With buccal respiration I see no reason why renewal of air to the tympanum should not take place during swallowing except in the few cases where the growths entirely envelope the Eustachian cushions.

The truth lies in the fact, I hope clearly proved in the last chapter, that during sleep nasal respiration is continued in spite of difficulties. For long hours together this strong instinct causes diminished air tension behind the seat of obstruction, viz., in the naso-pharynx, Eustachian tubes and tympanic cavities, as well as all the

respiratory tract: for hours together the tympanic membranes are being both sucked in and pressed in, and for hours together the vessels of the mucous membrane of these cavities are being kept gorged with blood, and during these same hours, too, the act of swallowing, which if constant might redeem the situation, is almost in abeyance. Looked at in this light there is little wonder that ear complications are of such common occurrence in cases of adenoids, and it is almost surprising that they are not a constant complication where the stenosis is at all great.

It might be objected that as the Eustachian tubes are only opened during deglutition, air could not escape except during that act. This, however, is not so; the vibrations communicated to the air in the middle ear through the drum during every perceptible noise are constantly driving out some small quantities of air, thus creating a necessity for a new supply—which takes place during swallowing. Even if this were not so we must remember that in nasal stenosis there is during inspiration a diminished air tension in the naso-pharynx, and that con-

sequently the heavy pressure of the atmosphere acting through the drums, would be sufficient to force the walls and orifices of the Eustachian tubes apart, and drive out the air in the tympanum in its endeavours to equalize the air pressure in that cavity and in the naso-pharynx.

In connection with this subject, the same relation between deafness and enlarged tonsils may be found, as was pointed out in discussing deformities of the chest. In cases of post-nasal growths alone the tympanum has a chance of recovering itself during the day when buccal respiration is going on ; in cases of enlarged tonsils alone there is seldom deafness because nasal respiration is free by night and by day, but in cases of post-nasal growths and enlarged tonsils *combined* there exist the most favourable conditions for diminished intra-tympanic air tension, since there is obstructed nasal respiration by night and obstructed buccal respiration by day, so that the tympanum has no chance of recovering itself. It is I think a clinical fact that the worst cases of ear trouble complicating adenoids are those in which there are also enlarged tonsils.

In insisting on the persistence of nasal respiration during sleep in spite of difficulties as being the great cause of ear troubles, I do not wish to deny that the growths may overlap the orifices of the tubes, and so cause deafness ; or that inflammation may on occasions spread up the tubes from the post-nasal space, but I have seen so many cases in which neither of these causes could possibly account for the ear complications that some other explanation more universally applicable seemed necessary. Others, too, must apparently have observed this immunity of the tubes from direct pressure, for in the illustrations of adenoids given in text-books it is quite the exception to see the growths depicted as over-lapping the Eustachian orifices.

2. **Chronic laryngitis** is nearly always present to a greater or less degree. There are two factors in the production of this complication : firstly, hyperæmia due to diminished air tension, and secondly, irritation of unwarmed and unmoistened air due to buccal respiration during the day. It soon disappears on removing the growths. It is worth remembering that the

laryngitis which occurs during the breaking of the voice at puberty, may be greatly aggravated by the existence of adenoids, and that the unpleasant transition stage may be very much prolonged by them, and that conversely the voice may be quickly improved by freeing the nasal passages of obstruction.

3. **Frequent colds.**—Another frequent complaint in cases of post-nasal growths is that the child is constantly catching cold; this is hardly to be wondered at considering the hyperæmic condition of the parts, and also taking into account the fact of buccal respiration during the day. The air enters the pharynx and no doubt penetrates to the naso-pharynx in an unwarmed unmoistened condition, which in itself is likely to set up catarrhs—moreover, it passes on to the lungs still insufficiently warmed and so often causes bronchitis.

4. **Cough,** apart from that due to bronchitis, sometimes complicates adenoids; it is undoubtedly of a reflex nature, and is hard, dry, and barking in character; indeed it closely resembles that often heard on passing a Eustachian cathe-

ter into the post-nasal space, or on irritating the external auditory meatus.

5. **Laryngismus stridulus.**—This is occasionally met with in these cases, and is also probably due to reflex irritation, and may disappear on removing the growths. This complication is most distressing both to the patient and friends, and in any case of laryngismus of doubtful origin where post-nasal growths are found it is quite worth while to remove them, though a guarded prognosis should be given as it may depend on some less obvious source of irritation. MacDonald mentions a case of laryngismus stridulus passing on into general convulsions which was entirely remedied by removing the adenoids.*

6. **Night sweats** are sometimes marked, but apparently have no direct relation to the growths; they probably occur in cases where the children are also rickety or strumous.

7. **Epistaxis** is occasionally met with, but I have never seen a case where it has been at all serious.

* "Diseases of the Throat," 2nd edit., p. 253.

8. **Olfaction** is frequently impaired, and in rare instances abolished.

9. **Stammering** and post-nasal growths often occur together, and the former is sometimes cured or relieved by the removal of the latter; but in what way this takes place I am not prepared to make a suggestion.

10. **Hay fever and hay asthma.**—These troubles are also often associated with the existence of post-nasal growths. It seems probable that the former is due to an hyperæsthetic condition of the nasal mucous membrane induced by the presence of the growths, and that the latter is due to foreign particles impinging on the hyperæmic and hyperæsthetic mucous membrane of the bronchial tubes during buccal respiration. Whether this is so or not the fact remains that both troubles may often be cured, or at any rate relieved by removing the growths.

11. **Incontinence of urine** is sometimes relieved by treating adenoids. Dr. MacDonald has kindly given me notes of a case of his in which this trouble, which was of long-standing disappeared after removing post-nasal growths, in a lad ten years of age.

CHAPTER IV.

DIAGNOSIS, TREATMENT, INDICATIONS FOR REMOVAL AND PROGNOSIS.

Diagnosis.—There can seldom be any doubt about the diagnosis of these cases when at all well marked. The characteristic expression, the mouth breathing by day, the snoring and restlessness by night, the results of rhinoscopic examination, as well as the typical “bag of worms” sensation conveyed to the finger when introduced into the naso-pharynx are all unmistakeable. Moreover, Bosworth’s method of spraying atomized oil into one nostril and noting how it returns from the other should be helpful. Finally, when ear troubles are present, the indrawn membrana tympani, with its thickened, dull, fleshy appearance is of itself almost pathognomonic. When all, or two or three, of these symptoms are to the front, there can be no doubt as to the diagnosis.

Perhaps in most cases the first symptom to be noticed is snoring at night, and very often it is the only one which can be elicited. This it must be remembered, always means in children some impediment to the free entry of air during nasal inspiration, the cause of which is generally, though by no means always, post-nasal growths. If, therefore, one is consulted because a child suffers from asthma, epilepsy, laryngismus stridulus, or any of the remote complications of the presence of growths in the naso-pharynx, one should always remember the possibility of trouble in this region being their starting point, and enquire if the child snores, and if so proceed to examine the post-nasal space, and should growths be found, the question of removing them must be carefully considered. It is in these cases, where the growths are not the main feature, that some judgment in diagnosis is required, and it is well for every one to bear in mind the possibility of adenoids causing such remote troubles as those mentioned above, and if there is no obvious source of irritation elsewhere, to examine the post-nasal space.

Differential Diagnosis.—There are a few troubles which possibly might be mistaken for adenoid vegetations ; namely :—

1. Polypus in the naso-pharynx. This is practically never found in children.

2. Fibrous growths. These do occur in children, but are of quite a different consistency, being firm and hard, and if seen are of a darker purplish colour.

3. Enlargement of the posterior ends of the inferior turbinated bodies. Careful digital examination cannot fail to make sure the diagnosis.

4. Retro-pharyngeal abscess. This is hardly likely to be mistaken for adenoids. It is situated lower down, is a more acute trouble, and gives rise to very painful deglutition, and to stiffness and pain down the back of the neck.

5. Stenoses of the anterior nares. It must not be forgotten that any stoppage in the nose will, in children, produce some of the symptoms of post-nasal growths, such as snoring, open mouth, and disturbed rest. But as a matter of fact, any stenosis of the front part of the nose, if of long standing, is generally accompanied by post-nasal growths, and both ought to be treated.

Treatment.—When once it is clear that the growths are actually doing harm, and it is determined that they must be got rid of, the treatment is simple enough. It may be divided into (1) Medical ; (2) Surgical.

1. **Medical.**—In very slight cases local astringent applications, such as a weak solution of glycerine of tannin, accompanied by change of air to the sea side may do good, but as remarked before, such benefit is likely to be only temporary. If the patient catches a cold the symptoms at once reappear, and if left alone tend to become worse. However, there are some few cases where these means are sufficient, and if the existing symptoms are not of a serious nature, they may by all means be first tried. If, however, there are marked complications, such as severe ear troubles, they are only waste of time.

2. **Surgical.**—This of course consists in removing the growths. There are various methods and instruments lauded for this purpose, all of which are good in certain hands. The great objects to be kept before the operator are thoroughness and celerity, and in whatever way

these can be most easily attained is the best way. Personally I prefer having the patient under the influence of chloroform, and using Löwenberg's forceps, simply because I have always practised this method. There is one point, however, I would strongly insist on, and that is the impossibility of effecting a thorough removal with a Gottstein's curette, or finger nail without chloroform or under gas. I have examined very many cases done by these methods by various operators, and have hardly ever failed to find some considerable amount of growth left, and have often noticed that the deafness is, in consequence, only temporarily or partially benefited. I have found too, that one ear may have improved, whilst the other has remained stationary, and I now always feel sure before looking that considerable stenosis has been left on the unimproved side. Therefore unless there be strong reasons against the administration of chloroform I think it always best to give it, and make sure that a thorough clearance is made, either with forceps or a curette. In a few cases, occurring in older patients, where

there is only a single pad of growth, gas will give sufficient time for removal, but in younger patients it is impossible to effect a thorough clearance in this way. Thoroughness is especially necessary in ear complications.

Indications for treatment.—Now as regards the indications for removal, which is a somewhat wide question. Undoubtedly there are many cases where a considerable mass of post-nasal growths cause absolutely no symptoms, and very many children have a few and are in no way the worse for them. On the other hand the size of the growths may be but small and yet they may cause most serious trouble. This apparent anomaly may be accounted for, firstly, by the position of the growths, and secondly, by the size of the post-nasal space, which in children differs enormously. Moreover, should the growths not commence until fifteen or sixteen years of age they are not half so likely to cause mischief as when they occur in quite young children, as by then the naso-pharynx has increased, and is fast increasing in size. This rapid development of the space at about the

age of puberty partly accounts for the disappearance of the symptoms as age advances, as much indeed as does the shrinkage of the growths themselves, which usually occurs. In cases then which are causing absolutely no trouble they should be left alone, but the patients should be carefully watched as a few colds may at any time start symptoms which tend to progress and become serious if left untreated.

Believing, as I do, that most of the complications of post-nasal growths can be traced to instinct insisting on nasal inspiration during sleep, whilst the will-power is suspended, I think the first thing to ascertain is whether the child snores at night—and whether his sleep is at all broken. If this is so, I think operation is justifiable, for we know that with every cold the child catches the growths tend to enlarge and so to increase symptoms; although in some cases they return to their original dimensions they more often remain increased in size—consequently all symptoms are as a rule progressive. It is not a serious operation, and therefore, why wait for grave symptoms, or run risks of the

child's general health, and physical and intellectual development becoming impaired.

In cases where there is only some snoring, and the child suffers from attacks of asthma, epilepsy, or laryngismus stridulus, I think that the growths should certainly be removed, for the snoring shows deficiency of inspiration and it is possible that after removal the accompanying malady may clear up. It must always be remembered, however, that there may be some other more remote cause, *e.g.*, intestinal worms, to account for the asthma, &c., and it is advisable to try and negative this first by appropriate remedies, and in any case no very definite prognosis should be given as to the chances of these troubles being cured by removing the growths.

Again, I think in children who are contracting the typical facies the growths should be promptly removed, for this appearance may become permanently stamped on the patient's features if they are left too long, and it is one of the most painful types of face. Probably it will never happen that this is the only matter entering into the question of removal, for if the growths

are obstructive enough to cause disfigurement, they are sure to produce other, perhaps more serious, symptoms, but in doubtful cases where the facies is marked I think it is certainly a point which ought to be taken into consideration. The case quoted on p. 14, shows that even where the growths are excessive, prompt removal will save the patient from the typical disfigurement.

In cases where there are ear troubles, even though quite incipient, there should be no hesitation whatever. Not only is deafness a serious trouble in itself, but at the age at which it generally occurs, it is the greatest drawback to the child's education, and as before stated it must be borne in mind that middle ear trouble almost invariably increases if left untreated.

In short, I should say, that if post-nasal growths are causing any symptoms at all it is right to remove them. If on the other hand they are doing absolutely no harm whatever one should wait and watch. Before deciding, however, it is necessary to make quite sure that none of the many troubles which may be caused by their presence have been overlooked.

Dangers of the operation.—The following are the dangers incurred by the removal of the growths:—

1. Risk of chloroform.
2. Recurrent hæmorrhage.
3. Acute otitis media.
4. Pneumonia.

1. **The risks from chloroform** are very slight. There has only been one death from chloroform at the Hospital for Diseases of the Throat, Golden Square, since its foundation in 1863, and during the last ten years only chloroform has been administered 1281 times for the removal of post-nasal growths. Further, at St. Bartholomew's Hospital, chloroform anæsthesia has been induced 16,213 times during the last ten years with only nine deaths, and no death between eight months and twenty years of age—during which period adenoids are most frequently found, and none of the nine deaths were during operation for post-nasal growths.

I mention these facts to show how little stress need be laid on this particular danger, although of course it is but right that the parents should

know that there is some slight risk before consenting to an operation. This risk may be minimised by the degree of anæsthesia produced by the position of the patient, and by the celerity of the operator. Firstly, the chloroform should not be pushed sufficiently far to abolish all reflexes. As it is most important that the patient should be able to cough up any blood that may find its way into the larynx, but at the same time it should be administered sufficiently deeply to produce muscular relaxation, for the operation is difficult if the soft palate is rigid. The nasal obstruction also renders the administration of chloroform more difficult—for as in natural sleep, so in artificial narcosis, instinct insists on nasal respiration, and consequently inspiration and the supply of oxygen are very insufficient, and moreover, it is difficult to estimate the quantity of chloroform which is actually being inhaled. I have somewhat frequently seen this obstruction to nasal inspiration give rise to laryngeal stridor during the early stages of chloroform anæsthesia, just as it may in natural sleep. To obviate these difficulties it is well to put the gag

in the mouth, unexpanded, before the inhalation of the chloroform is commenced, and as the patient falls asleep to open it sufficiently to make buccal respiration easy. In this way anæsthesia can be produced more evenly and rapidly, and the danger of laryngeal spasm is diminished. Secondly, the position of the patient is of great importance. Perhaps the ideal position is that recommended by MacDonald, namely, with the patient lying on his side and with his face towards the operator, for in this way the blood will run out of the nose and mouth, and there is no chance of drowning the patient in his own blood, but it is certainly uncomfortable for the operator, and prolongs the operation. I prefer to have the patient on his back, with his shoulders raised and his head thrown back as far as possible, or with his head hanging over the operating table. In this way the operation can be most quickly accomplished, and by sponging out the pharynx once or twice there is very little risk of blood reaching the larynx. Lastly, the quicker the operation is done the less are the risks. It must be remembered that the

hæmorrhage is really severe whilst it lasts, and that it lasts just as long as the operation does, and therefore the dangers of getting blood into the air passages are proportionately increased with the length of the operation. Moreover, we must not forget that a prolonged operation increases the chances of getting blood in the Eustachian tubes and tympanic cavities, which is the great source of acute otitis media after removal of adenoids. Directly the operation is concluded the gag should be removed, and the patient turned on his side. It is important to get the gag out of the mouth as quickly as possible, for I have often noticed that though the actual operation is concluded the hæmorrhage will continue as long as the mouth is gagged open. I have seen it left in with the idea of allowing the free escape of the blood—but this is a great mistake.

2. Recurrent hæmorrhage is a very rare accident. I have never had a case myself, and have only seen it once. This commenced some eight hours after the operation and was very troublesome, but was eventually arrested suc-

cessfully and the child made a good recovery. In this case the growths were removed by forceps with a cutting edge which I cannot help thinking may have caused the accident.

3. Acute otitis media is now a comparatively rare accident. Cleanliness and celerity during the operation and avoidance of doing anything which may force blood or secretions up the Eustachian tubes during the first day or so after the operation, are the great safeguards against this complication. If, however, it does occur it never leads to any permanent damage.

4. **Pneumonia.**—Sometimes one meets with pneumonia after the removal of adenoids. It is due to the inhalation of blood during the operation, and the danger is minimised in the same way as are the risks from the administration of chloroform.

After Treatment.—The patient should be carefully guarded against any risks of catching cold; he should be kept in bed for the first twenty-four hours or so, and in the house for from four or five days to a week, or even more according to the weather. At the end of the first thirty-six

or forty-eight hours an alkaline cleansing lotion should be sniffed or sprayed up the nostrils two or three times a day. Forcible syringing or douches should be avoided as being likely to drive the secretions up the tubes to the middle ear, especially if the patient happens to swallow during the process. If ear complications should occur, they must be treated in the ordinary way. If there is any undue hæmorrhage small pieces of ice should be slipped through the nostrils into the naso-pharynx by which means it is generally arrested.

There is often much discomfort in swallowing for the first twenty-four hours after the operation, which is generally due to bruising and swelling of the soft palate. It is best remedied by making the patient constantly suck ice, which relieves the pain and moderates the swelling. If the pain is severe a cocaine lozenge before taking nourishment is often of service.

If after a fortnight or three weeks there is still much deafness, Eustachian inflation should be practised regularly for a time ; at first once a day, then every other day, and then twice a week,

and so on until a permanent improvement is secured. Often once a week for a short time is quite sufficient, it is only in severe cases that it need be done once a day. If commenced too soon after the operation there is a risk of setting up acute otitis from blowing some discharge into the middle ear.

Lastly, the anterior nares should be carefully examined and if there is enlargement of the inferior turbinated bodies or any other condition causing stenosis they should be promptly treated.

Prognosis.—As regards the more immediate complications and effects of post-nasal growths the result of operation is nearly always extremely good. The distress at night, and the snoring rapidly disappear, though it should be remembered that for the first night or two it may possibly be worse, due to swelling and exudation. The deafness as a rule quickly improves, and if after two or three weeks it comes to a standstill the cure may be completed as already suggested by means of Eustachian inflation. This indeed is very often necessary in cases of long-standing. The muco-purulent catarrh also disappears, and

the child's general health picks up wonderfully, he becomes livelier, quicker and brighter, and shows greater eagerness and intelligence over his lessons, and often too he will make quite a fresh start in the matter of growth and development; and finally the laryngitis is relieved and the tendency to bronchitis and cold catching is certainly diminished. All these improvements may, I think, be fairly strongly assured to the patient and his friends, but there are other points about which some caution must be used in expressing a prognosis—for example, the open mouth and the manner of speech. The former has generally become a habit which remains after the cause has been removed. Parents can and must do a great deal to teach the patient to keep his mouth closed, they must perpetually correct him when it is open and admonish him to keep it shut.

Some recommend tying the mouth up by means of a bandage at night which may be useful in some instances, though it is generally unnecessary if sufficient pains are taken during the day.

The peculiar speech too often persists after removal of the obstruction—partly from habit and partly from weakness of the soft palate, which may remain for some time. Here again a great deal may be done by correction on the part of parents, and by care and pains on the part of the patient. Tonics too, and gargling with cold water, may help to restore the activity of the soft palate. In obstinate cases, however, much good may be done by a course of lessons in elocution from some good teacher; in this way they learn how to speak correctly, and moreover definite lessons may be set to strengthen the action of the palate. Then again when giving a prognosis as to the hope of curing asthma, epilepsy, laryngismus, or stammering, great caution is necessary, as stated above, yet I think one may justly say that enough cases have been relieved by removal of adenoids to make it quite worth while to try it in any particular case. Asthma and laryngismus I should say are more often remedied in this way than epilepsy and stammering, therefore one may give a little more hopeful prognosis in the two former troubles.

In all of them, however, he would be a foolish man who spoke with any great assurance on the prospect of successfully curing these troubles by clearing the naso-pharynx of adenoids.

Chances of recurrence.—One is often asked whether if removed the growths will “grow” again? If the removal is thorough, I think one may as a rule confidently say they will not. Nearly all cases of recurrence with which I have met have been scraped in the first instance with a finger nail or a curette. It is impossible to thoroughly remove the growths with the finger; soft though they be, their attachments are too firm for this, moreover, operators who use this method do not anæsthetise the patient, the whole thing is over in some twenty or thirty seconds, and I feel sure it is impossible to make a thorough clearance in so short a time. True, some may be removed, but the major part is simply crushed and bled, and heals and grows again. The immediate relief of symptoms is satisfactory enough but they are not lasting. So too if the curette is used carelessly much of the growth is only crushed, and some remains

untouched, whilst only a small portion is radically removed, and the symptoms, ameliorated at first, gradually return. As stated above the curette cannot be efficiently used without time and care, and the finger in the post-nasal space, which means the administration of chloroform, or some anæsthetic of longer duration than gas. And further, with regard to the question of recurrence, I should say that there is always a risk in infants. I have already quoted a case of my own* where recurrence took place after removing growths from an infant, eighteen months old, and I have seen several similar cases. I think it is due to the extreme difficulty in carrying out any after treatment, which, when left to the mother, as generally happens, is quite hopeless, and consequently the nose remains blocked with discharge, and many of the conditions favourable to the growth of adenoids being unaltered, they recur. The younger the patient the greater the risk of recurrence. Again, in patients who are also the subjects of congenital syphilis, recurrence seems to be the rule rather than the

* See page, 34.

exception, unless antisyphilitic remedies are exhibited for some time after the operation. In conclusion, adenoids often appear again in patients who have high arched and v-shaped palates, and in any case where there is obstruction of the anterior nares, which is not or cannot be removed.

Post-nasal thickening.—There is one other point which I think may justly be alluded to, though perhaps this is not altogether the proper place, it is the existence of post-nasal thickening in people of more advanced years, and the great benefit which may be given by its removal. Of course all specialists are aware of this, but hardly a general practitioner seems to give it a thought that in a patient of over 20 or 25 there may be a growth of lymphoid tissue in the naso-pharynx causing trouble. They may find the deafness, the tinnitus, and the post-nasal catarrh, but they do not seem to realise that the source of these troubles is as likely to be post-nasal growths, or rather their shrunken remains, in a patient of 30 or 35, as it is in one of 12 or 14. The removal of this thickening will often markedly alleviate deafness,

tinnitus, and purulent otitis, it will oftener still arrest their progress, and it will as a rule cure the post-nasal catarrh. Yet in the matter of prognosis it must be remembered that the older the patient, and the older the ear complications, the less hopefully must one hold out prospects of relief by treatment. We know, however, that post-nasal catarrh is in itself a most distressing symptom to many patients, and if by removing the atrophied remains of adenoids we can alleviate this, and this only, we shall have done a great deal. It is a simple operation, and can generally be done quite satisfactorily by means of a Gottstein's curette under laughing gas, or even without any anæsthetic.

In conclusion there remains but little to be said. If I have succeeded in bringing before those not already familiar with the trouble, a picture by which they may easily recognise post-nasal growths, and have shewn to them the importance of not trusting too much to "Time" to remove the accompanying evils one object of this little book will have been attained.

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